

CLAIMS

What is claimed is:

1. In a refrigerator comprising at least one compartment, selectively enclosable by a door, and containing at least one removable shelf and means for mounting the at least one removable shelf within the compartment, the improvement comprising:

5 a power bus disposed within the compartment, electrically connected to a power source, and a connector disposed on the removable shelf, whereby when the removable shelf is mounted within the compartment by the mounting means, the connector is connected to the power bus to deliver power to the removable shelf.

2. The improvement of claim 1 wherein the power bus comprises a ground conductor and a power conductor.

3. The improvement of claim 2 wherein the refrigerator has a control circuit for controlling at least one atmospheric parameter within the compartment, a shelf portion of the control circuit being mounted to the removable shelf, and a main portion of the control circuit being disposed remotely of the removable shelf, whereby the shelf 5 circuit portion is powered by way of the power bus when the removable shelf is mounted within the compartment by the mounting means.

4. The improvement of claim 3 wherein the parameter controlled by the control circuit is temperature, and the shelf circuit portion has a user interface for adjusting the temperature from the removable shelf.

5. The improvement of claim 4 wherein actuation of the user interface generates a data signal in the shelf circuit portion and the data signal is transmitted to the main circuit portion.

6. The improvement of claim 5 wherein the data signal is transmitted to the main circuit portion by way of the power bus.
7. The improvement of claim 5 wherein the data signal is transmitted to the main circuit portion by way of induction.
8. The improvement of claim 5 wherein the data signal is transmitted to the main circuit portion by way of at least one data line.
9. The improvement of claim 3 wherein the power source is an isolated power supply in the main circuit portion.
10. The improvement of claim 9 wherein the power supply is 24 volts.
11. The improvement of claim 3 wherein the main circuit portion has a constant current source and voltage comparator coupled to a refrigerator control.
12. The improvement of claim 11 wherein the constant current source comprises a transistor.
13. The improvement of claim 11 wherein the constant current source and the voltage comparator are connected to the refrigerator control by at least one opto-isolator.

14. The improvement of claim 11 wherein the shelf circuit portion comprises a first user interface circuit having a first switch, at least one LED and a first resistor, the first switch and the at least one LED being connected in series and the first resistor and the at least one LED being connected in parallel.
15. The improvement of claim 14 wherein in a first mode, the first switch is actuated and the at least one LED is lit, indicating a first user setting.

16. The improvement of claim 14 comprising a second user interface circuit having a second switch, at least one second LED, and a second resistor, the second switch and the at least one second LED being connected in series, and the second resistor and the at least one second LED being connected in parallel, the second resistor having a 5 significantly different resistance value than the first resistor, the first user interface circuit and the second user interface circuit being connected in parallel.

17. The improvement of claim 16 wherein one of the shelf circuit portion and main circuit portion has a capacitor connected in series across the power supply to the first and second resistors, and wherein selective actuation of the first or second switch will disengage the LED serially connected to the actuated switch, causing voltage to rise 5 in the capacitor at a rate determined by the resistance value of the resistor serially connected to the actuated switch, which rate is timed by the voltage comparator and signaled to the refrigerator controller whereby the refrigerator controller can identify which switch is actuated.

18. The improvement of claim 11 wherein the shelf circuit portion comprises a touch sensor switch, a microprocessor, a voltage regulator, a capacitor, and at least two parameter circuits, each parameter circuit corresponding to a predetermined microenvironment within the compartment, and each parameter circuit comprising an 5 LED, an LED resistor and an LED drive transistor, serially connected, the parameter circuits, microprocessor, touch sensor switch and capacitor being connected in parallel, and the main circuit portion has a microprocessor, whereby actuation of the touch sensor switch for a selected setting sends a signal corresponding to the selected setting to the main circuit portion microprocessor by way of the power bus.

19. The improvement of claim 18 wherein actuation of the touch sensor switch disengages the LEDs, and the signal comprises a time value corresponding to the time it takes voltage to recover to a predetermined value across the capacitor as measured

5 by the voltage comparator, whereby the selected setting can be received and stored by the main circuit microprocessor.

20. The improvement of claim 19 wherein power to the shelf circuit portion is discontinued when the door is closed.

21. The improvement of claim 1 wherein the mounting means includes a shelf ladder and the removable shelf has a bracket that mounts to the shelf ladder to support at least a portion of the removable shelf by cantilever.

22. The improvement of claim 21 wherein the power bus is within the shelf ladder.

23. The improvement of claim 1 wherein a microenvironment zone is partially defined by the removable shelf, and the removable shelf comprises a user interface that controls at least one atmospheric parameter within the microenvironment zone.

24. The improvement of claim 23 wherein the refrigerator has a control circuit for controlling the at least one atmospheric parameter, the removable shelf comprising a shelf portion of the control circuit, and a main portion of the control circuit being disposed remotely of the removable shelf, whereby the shelf circuit portion is powered by 5 way of the power bus when the removable shelf is mounted within the compartment by the mounting means.

25. The improvement of claim 23 wherein the power bus comprises a ground conductor and a power conductor, the power conductor comprising separate sections, one section for each microenvironment zone.

26. The improvement of claim 25 wherein the refrigerator comprises visual indicia to indicate the location of each microenvironment zone.